ALEKSANOV, B.A., inzh.; SAL'NIKOV, V.Ya., inzh.; BRONSHTEYN, I.I., red.

[Safety manual for bulldozer operators] Pamiatka po tekhnike bezopasnosti mashinista bul'dozera. Moskva, Energiia, 1964. 12 p. (MIRA 17:9)

1. Vsesoyuznyy institut po proyektirovaniyu organizatsii energeticheskogo stroitel'stva "Orgenergostroy." Kuybyshevskiy nauchno-issledovatel'skiy sektor.

BRONSHTEYN, I. I.; SLEZINGER, I. I.; and LUNIN, O. G.

"Problems of the automatization of candy products", Avtomatika i Telemekhanika, Vol 15, No 3,4,5, 1954

Abs

W-31148, 7 Feb 55

LUNIN, O.G. (Moscow); BRONSHTEYN, I.I. (Moscow); SLEZINGER, I.I. (Moscow)

Automatization in the confectionery industry. Avtom. i telem. 15 no.5:445-448 S-O '54. (MLRA 8:1)
(Confectionery industry)

BRONSHTEYN, I.I.; SMOLYANITSKIY, M.Kh.

Automatic unloading of caramel from coil-type vacuum cookers. Ref. nauch. rab. VKNII no.1:39-43 '57. (MIRA 11:3)
(Caramel)

AVDEYEVA, A.V., doktor tekhn.nauk; ALEKHIN, S.F., inzh.; ALTUNDZHI, K.S., inzh.; BRONSHTEYN, I.I., kand.khim.nauk; BRUSHTEYN, M.S.; GRIGOR'YEV, F.B., inzh.; ZHELEZNOVA, V.V., inzh.; ISTOMINA, M.M., kand.tekhn.nauk; KOZLOV, S.A., inzh.; KOLESNIKOVA, V.K., inzh.; KOCHETKOV, I.A., inzh.; LUNIN, O.G., kand.tekhn.nauk; MANNINA, T.A., inzh.; SEREBRYAKOV, M.N., inzh.; SMOLYANITSKIY, M.Ye., inzh.; TYURIN, A.I., kand.tekhn.nauk; TSYBUL'SKIY, A.A., inzh.; CHERNOIVANNIK, A.Ya., inzh.; SHKLOVSKAYA, A.Ye., inzh.; BEN', G.M., inzh., retsenzent; MARSHALKIN, G.A., kand.tekhn.nauk, retsenzent; GUSAKOV, A.I., red.; MARTYNOV, M.I., kand.tekhn.nauk, red.; KRUGLOVA, G.I., red.; KISINA, Ye.I., tekhn.red.

[Confectioner's manual] Spravochnik konditera. Pod obshchei red. M.I. Martynova. Moskva, Pishchepromizdat. Pt.2.[Technological equipment of the confectionery industry] Tekhnologicheskoe oborudovanie konditerskogo proizvodstva. 1960. 630 p. (MIRA 14:3)

(Confectionery--Equipment and supplies)

BRONSHTEYN, I.I.; KONGEYEV, I.M.; SERBA, V.N.; SMIRNOV, A.F.

Automation of production lines in caramel manufacture. Trudy VKNII no.16:3-15 '62. (MIRA 16:5)
(Confectionery—Equipment and supplies) (Automation)

ANTOKOL'SKAYA, Mir'yam Yakovlevna; BRONSHTEYN, Isaak Iosifovich; MARTYNOV, Mikhail Ivanovich; SMIRNOV, Anatoliy Fedorovich; SHKLOVSKAYA, Anna Yevgen'yevna; ZHURAVLEVA, Ye.I., retsenzent; SOLOMONOV, P.I., retsenzent; YERMOKHINA, N.V., red.;

[Manual on raw materials, intermediate products and finished products in confectionery; manufacture; physicochemical characteristics] Spravochnik po syr'iu, polufabrikatam i gotovym izdeliiam konditerskogo proizvodstva; fiziko-khimicheskie kharakteristiki. Moskva, Izd-vo "Pishchevaia promyshlennost'," 1964. 229 p. (MIRA 17:5)

BRONSHTEYN, I.N.

6.4

PHASE I BOOK EXPLOITATION SOV/4022

Akademiya nauk SSSR. Institut nauchnoy informatsii

Avtomatizatsiya proizvodstvennykh protsessov v chernoy i tsvetnoy metallurgii (Automation of Production Processes In Ferrous and Nonferrous Metallurgy) Moscow, 1959. 130 p. 2,000 copies printed.

Additional Sponsoring Agency: USSR. Gosudarstvennyy nauchno-tekhnicheskiy komitet.

Ed.: A. B. Katsman; Tech. Ed.: P. N. Gavrin.

PURPOSE: This book is intended for metallurgists working in metallurgical plants and in scientific research institutes dealing with the problems of automation of metallurgical production processes.

COVERAGE: In the book is reviewed the state of automation of metallurgical plants of the ferrous and nonferrous metals industry. The present levels of automation of blast furnace

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and open hearth furnace processes and of steel rolling in the Soviet Union and elsewhere are described. The automation of ore mining and dressing and of the metallurgical processes as well as of casting and pressworking in nonferrous metallurgy is outlined. The use of control computers for automation of manufacturing processes in U.S.A., Great Britain, USSR and other countries is shown. No personalities are mentioned. There are 126 references: 82 English, 41 Soviet, 2 German, and 1 French.

TABLE OF CONTENTS:

Automation of Production (Cont.) SOV/4022

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9-16-60

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

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Nature of secondary emission of pure metals. I. M. Bronshtein. *J. Tech. Phys.* (U. S. S. R.) 13, 176-81 (1943).—Ag films of definite thickness from 0.5 to 10 at. layers are deposited on a Ni target by means of a mol. Ag beam of predetd. duration. The secondary emission ratio and the distribution of velocities of secondary electrons are measured and the measurements are interpreted as indicating a surface phenomenon for energies of primary electrons of 30-800 v. For energies ranging from 800 to 1500 v. a volume effect of secondary emission is superposed over the surface phenomenon. Serge Pakswer

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

BRONSHTEIN, I.M.

Central Geophysical Lab., (1944-)

"To the problem of the extinction of sound in atmosphere"

Iz. AK. Nauk SSSR, Ser. G ograf.i Geofiz., no. 1-6, 1944

BRONSHTEYN, I. M.

Meteorological Abst.
Vol. 4 No. 2
Feb. 1953
Bibliography on Turbulent Exchange

4B-129 551.596.1:551.551

Bronstein, I. M. K voprosu o zatukhanii zvuka v atmosfere. [The problem of the extinction of sound in the atmosphere.] *Akademiia Nauk. SSSR, Izvestiia, Ser. Geogr. i Geofiz.*, 8(4):151-153, 1944. 5 refs., 8 eqs. DLC—Author gives a quantitative determination for the coefficient of extinction of sound in the atmosphere, and shows connection between the coefficient of extinction of sound and turbulence of the atmosphere. (*Same item as* J-86, Oct. 1950, *MAB.*) *Subject Headings:* 1. Sound absorption 2. Atmospheric turbulence.—*M.R.*

DRONSHTEIN, I. M.

Secondary Electron Emission from Thin Layers of Be : Part 1.—I. M. Bronshtein & T. A. Smorodina. (Zh. eksp. teor. Fiz., Aug. 1954, Vol. 27, No. 2(8), pp. 215–223.) An experimental investigation is reported of the change of the secondary emission coefficient (σ) and the electron energy distribution with the adsorption of Be atoms on Ni. σ decreases monotonically with adsorption of pure Be, but increases at first with impure Be, decreasing finally to σ_{Be}. The emission depth of secondary electrons depends linearly on the energy of the primary electrons in the range 100–600 eV.

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APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000307020007-2"

USSR/Physics - Electron emission FD-2913

Card 1/1 Pub. 146 - 13/19

Author : Bronshteyn, I. M.; Smorodina, T. A.

Title : Secondary electron emission of thin layers of beryllium. II

Periodical : Zhur. eksp. i teor. fiz., 29, October 1955, 495-499

Abstract : The authors investigate the variation in the coefficient of secondary electron emission, sigma, and the distribution of secondary electrons according to their energies in the case where thin layers of beryllium are deposited onto a silver underbase. They establish that during this imposition of thin beryllium layers (theta equal approximately to 1) onto nickel and silver the maxima of the curves of distribution of secondary electrons from the nickel and silver are displaced toward the side of less energies of the secondary electrons. Seven references: e.g. I. M. Bronshteyn and T. A. Smorodina, ibid., 27, 215, 1954; I. M. Bronshteyn, ZhTF, 13, 176, 1943.

Institution : Leningrad State Pedagogic Institute

Submitted : June 14, 1954

Category : USSR/Photoeffect - Electron and Ion Emission H-2

Abs Jour : Ref Zhur - Fizika, No 1, 1957, No 1652

Author : Bronshteyn, I.M., Smorodina, T.A.
Title : Secondary Electron Emission of Thin Layers of Silver

Orig Pub : Zh. eksperim. i teor. fiziki, 1955, 29, No 4, 500-506

Abstract : The role of the underlining in the determination of the depth of emergence of the secondary electrons was studied by coating the target with varying thicknesses of the tested substance. Silver layers from one to one hundred atomic layers thick were coated on nickel, on beryllium, and on a 26-atom layer of beryllium adsorbed on nickel. It was found that the beryllium lining hardly affects the true depth d_t of the emergence of secondary electron from silver or the dependence of d_t on the energy E_n of the primary electrons. The true and experimental values of the depth of emergence, obtained by adsorption of silver on nickel, as well as their dependences on E_n, differ strongly from each other. It is therefore necessary to employ a beryllium lining to determine d_t. The value of d_t determined in this investigation depends linearly on the energy of the primary electrons in the 100 -- 600 ev range. It was established that if a layer of electro-positive metal with a thickness on the order of one atom is adsorbed, the maximum of the energy-distribution curve of the secondary electrons shifts towards the lower energies (by 1.8 ev in the

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Category : USSR/Photoeffect - Electron and Ion Emission H-2

Abs Jour : Ref Zhur - Fizika, No 1, 1957, No 1652

case Ag on Ni), and if atoms of electro-negative metal are adsorbed, the maximum shifts towards the higher energies (by 0.8 ev in the case of Ag on Be). This fact indicates that a change in the work function affects the distribution function of the secondary electrons. Bibliography, 14 titles.

BRONSHTEYN, I.M.

Secondary electron emission of thin layers of silver. I. M. Bronshtein and T. A. Smorodina. *Soviet Phys.* [illegible] (Engl. translation).—See C.A. 50, 2275*e*.
B. M. R.

BRONSHTEYN, I. M.
and
SMORODINA, T. A.

"On the Problem of Determining the Effective Output Depth of Secondary Electrons," Pp 85-87, ill, 7 ref

Abst: The article examines methods for determining the effective output depth of secondary electrons from substances which are of interest in clarifying the mechanism of secondary emission and also the kinetic movement of secondary, as well as (to a certain degree) primary, electrons in a substance. One method is the study of secondary emission and thin layers with increasing thicknesses. Data are presented which show that for an explanation of the change in emission properties of thin metallic layers for changes in their thickness, it is necessary to use a metallic base-layer.

SOURCE: Uchenyye Zapiski Leningr. Gos. Pedagog. In-ta Min-va Prosveshcheniya RSFSR (Scientific Notes of the Leningrad State Pedagogical Institute of the Ministry of Education RSFSR), Volume 17 -- Physics-Mathematics Faculty. No 2, Leningrad, 1957

Sum 1854

BRONSHTEYN, I.M.

AUTHOR: Bronshteyn, I. M.

TITLE: Reflection of Electrons and Emission of Secondary Electrons From Some Metallic Surfaces in the Range of Low Energies of the Primary Electrons (Otrazhennyye elektrony i vtorichnaya elektronnaya emissiya ot nekotorykh metallicheskikh poverkhnostey v oblasti malykh energiy pervichnykh elektronov)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Seriya Fizicheskaya, 1958, Vol. 22, Nr 4, pp. 443-447 (USSR)

ABSTRACT: The emission of secondary electrons from metals, as is known, is caused by elastically and inelastically reflected primary and true secondary electrons. Experimental data (references 1-7) show, that the correlation between the proportion of the true secondary and the elastically reflected electrons is dependent upon the energies E_p of the primary electrons. The difference in the dependence ... is conditioned by the difference in the energetical structure of the investigated samples. The coefficient of the electron reflection in the substance most apparently be

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Reflection of Electrons and Emission of Secondary Electrons From Some Metallic Surfaces in the Range of Low Energies of the Primary Electrons

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dependent in a certain way upon the density of electron states in the substance. In the present lecture the author presented the results of the investigation of the emission of secondary electrons and of electron emission in Ni, Pt, Al, Ag, Au, Cu, W, Mo and Ta in the energy range of the primary electrons of from 0,4 to 50 eV. The magnitude of electron spread in the beam was of the order of magnitude of from 0,8 - 1. The curves $\sigma = f(E)$ and $r = f(E_p)$ proved to be different in different substances. In Ni and Pt the curve $r = f(E_p)$ has a monotonous character. In Al, Ag, Au and Cu they are not monotonous. It seems, that the non-monotony of the reflection curves of Al, Ag, Au and Cu is caused by the influence of the periodic lattice field, that is to say, by the existence of energetical zones in the metal. The properties of the emission of secondary electrons in W, Mo and Ta were investigated already earlier (references 3, 4, 5 and 13). As the values of r of Mo, W and Ta are not only different numerically, but also the curves $r = f(E_p)$ have quite a different shape, which is

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Reflection of Electrons and Emission of Secondary Electrons from Some Metallic Surfaces in the Range of Low Energies of the Primary Electrons [illegible]

is very peculiar and irregular [illegible]. The properties of the emission of secondary electrons of these substances were investigated as in under identical conditions in the wider energy range of from [illegible] — [illegible]. Apart from the curves σ and r curves [illegible] are also given (Figures [illegible] and [illegible]). They characterize the dependence of the true secondary electrons and of the inelastically reflected primary electrons on E_0. It can be seen, that inelastic primary electrons in considerable quantities occur only at E_0 = 5 - [illegible] eV. The true secondary electrons appear at higher values of E_0. It is presumably impossible here to speak of an accurate coincidence of the threshold of secondary emission with the work function, as the beam of primary electrons was not sufficiently monoenergetic. Other sources of errors should also be eliminated as far as possible, as, e.g. the absence of a compensation of the [illegible] magnetic field in the apparatus. It is necessary to measure in the identical apparatus the work

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Reflection of Electrons and Emission of Secondary Electrons From Some Metallic Surfaces in the Range of Low Energies of the Primary Electrons 48-22-4-19/24

function and the electron reflection in parallel, in order to determine a coincidence between the secondary emission and the work function of the respective surfaces. [illegible] share in this work had [illegible]. [illegible] Tsveissin, N. D. Morgulis, [illegible], [illegible] and O. G. Bolyginskiy took part in the discussion on this lecture. There are 10 figures and 14 references, 7 of which are Soviet.

AVAILABLE: Library of Congress

1. Metals--Secondary emission 2. Electrons--Reflection 3. Secondary emission--Theoretical analysis

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24(6) SOV/57-28-10-16/40

AUTHORS: Bronshteyn, I. M., Roshchin, V. V.

TITLE: Electron Reflection and Secondary Electron Emission From Metallic Surfaces in the Region of Low Energy Primary Electrons. I (Otrazheniye elektronov i vtorichnaya elektronnaya emissiya ot metallicheskikh poverkhnostey v oblasti malykh energiy pervichnykh. I)

PERIODICAL: Zhurnal tekhnicheskoy fiziki. Vol 28, Nr 10, pp 2200-2208 (USSR)

ABSTRACT: This paper gives an account of the development of a method of measuring the coefficients σ and r (σ and r denoting the coefficient of secondary emission and the reflection coefficient) in the range of E_p (energy of primary electrons) of 0.2 to 0.4 eV. The method and the technique of the experimental procedure is described and the results for nickel are presented. The second paper will contain information concerning Cu, Ag, Au, and Al. This paper features the curves $\sigma = f(E_p)$ and $\sigma = f(-V_C)$, V_C denoting the collector potential. (The device used for the investigation of electron reflection was composed of a collector, a target, an electron gun, and a getter-tube.) A hollow sphere

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with a diameter of 140 mm, the interior of which was coated with a semitransparent nickel layer, served as collector. The ordinates of the retardation curve in the vicinity of point $V_C = -V_p$, where the secondary current sharply declines, yield the coefficients of elastic reflection of the primary electrons of a definite energy. Thus the dependence of σ and r upon E_p can be measured simultaneously, and the energy spectrum of the secondary electrons can be studied. The diagram $\sigma = f(E_p)$ is a substantial proof of the fact that in the total energy range investigated the purity of the surface plays a decisive role. It is shown that the reflection factor is particularly sensitive to surface impurities in the range of very small electron energies (0 to 4 eV). For nickel the reflection factor r = 0.13, with $E_p = 0$. It is equal to the r of silver (Ref 4). The retardation curves present a means of obtaining the energy spectrum of the secondary electrons. This spectrum is composed basically of two parts: One which is due to secondary electrons, and one which is due to elastically reflected primary electrons. The reflection factor r (specifying the relative proportion of elastically reflected primary electrons) of electrons reflected from a nickel surface decreases monotonously from 0.12 to 0.13 at $E_p = 0$ to 0,2 at $E_p = 30$ eV. From a comparison of the r values for nickel as obtained in this work with the computed values presented in reference 10 proceeds that the experimental and the theoretical curve $r = f(E_p)$ have the same nature. Real secondary electrons were in the course of experiments found only at $E_p > 5$ eV. The position of the low-voltage maximum in the secondary electron spectrum is in the range of 5 - 15 eV essentially dependent upon the energy of the primary electrons. From $E_p > 15$ eV this maximum is independent of E_p. This may be explained, according to the paper cited by reference 14 that the emitted secondary electrons participate in the electron cascade while diffusing to the surface. Only such electrons, however,

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are capable of participating in this cascade, which are produced at a sufficient depth (that is to say, by primary electrons, the energy of which is sufficient to propagate them to this depth).

A. A. Lebedev, Member, Academy of Sciences, USSR, Professor L. N. Dobretsov, and Docent M. A. Rumsh discussed the results of this work with the authors.

There are 12 figures and 17 references, 9 of which are Soviet.

SUBMITTED: May 1, 1957

Card 4/4

BRONSHTEYN, I.M.; ROSHCHIN, V.V.

Electron reflection and secondary electron emission from metallic surfaces in the low energy of primary electrons. Part 2. Zhur. tekh. fiz. 28 no.11:2476-2488 N '58. (MIRA 12:1)
(Electron emission)

9(3)

SOV/20-123-4-17/53

AUTHORS: Bronshteyn, I. M., Segal', R. V.

TITLE: Free Path of Slow Secondary Electrons in a Metal and the Part Played by Inelastically Reflected Electrons in the Secondary Electron Emission (Probeg medlennykh vtorichnykh elektronov v metalle i rol' neuprugo otrazhennykh elektronov vo vtorichnoy elektronnoy emissii)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 123, Nr 4, pp 639-642 (USSR)

ABSTRACT: According to L. N. Dobretsov and T. L. Matskevich (Ref 2) a considerable part of slow secondary electrons (in some cases up to 50%) may be due to inelastic scattering. For the coefficient of the total secondary emission σ it holds that $\sigma = \delta + \eta$, where δ and η denote the coefficients of the slow secondary and fast elastically and inelastically scattered electrons. The present paper intends experimentally to explain the part played by η in the production of slow secondary electrons (δ) and the range λ_2 of the slow secondary electrons (i.e. of the depth of the "exit zone" of the slow secondary electrons). Measurements were carried out by means

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Free Path of Slow Secondary Electrons in a Metal and the Part Played by Inelastically Reflected Electrons in the Secondary Electron Emission

of an apparatus of the type of a spherical condenser with an antidynatron grid. Thin layers of various metals are sprayed on to a target in a vacuum of from 5.10^{-8} torr to 10^{-7} torr at a previously gauged velocity. The variations of σ and η of these thin layers were measured at the energies of the primary electrons of from E_p = 0.1 to 3.6 kev. The coefficients σ and η for Be are by several orders smaller than the same quantities for Pt, Ag and Bi. If the thickness of the layer changes at E_p = const, the coefficients δ and η at the same time become greater. A diagram shows the function $\delta(\eta)$ for the case in which thin Bi and Ag films are sprayed on to a beryllium base and Be films are sprayed on to a platinum base. The temperature of the base was -180°. At low energies ($E_p \sim 600$ ev) this function has the shape of a straight line, but at high energies E_p = 3,600 ev) it has the shape of a broken line consisting of 2 rectilinear sections. At E_p = const the boundary values of δ and η corresponding to a massive layer of the sprayed metal are attained simultaneously at one

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and the same thickness d of the layer. The course of the function $\delta(\eta)$ for bismuth - and silver films can be explained qualitatively as follows: As long as it holds that $d \leqslant \lambda_2$, δ will increase with an increasing thickness d of the layer due to the increase of the following quantities: 1) The quantity of slow secondary electrons produced immediately by primary electrons. 2) The quantity of inelastically scattered and inelastically reflected electrons (η) and 3) the "efficiency" of each inelastically scattered electron, which is proportional to d. Next, the course taken by the curves for beryllium films on a platinum base is explained. According to these and other experimental data discussed here the primary electron penetrating into the metal immediately produces a small quantity of secondary electrons. With increasing penetration of primary electrons into the depth of the metal an ever increasing number of inelastically scattered electrons is produced and a part (η) of them emerges into the exterior. The slow secondary electrons emerge from the thin superficial film (of the order of 10

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atomic layers) and are essentially produced by inelastically scattered electrons, i.e. they are in reality "tertiary" electrons. There are 3 figures and 4 references, 3 of which are Soviet.

ASSOCIATION: Leningradskiy gosudarstvennyy pedagogicheskiy institut (Leningrad State Pedagogical Institute)

PRESENTED: July 21, 1958, by A. F. Ioffe, Academician

SUBMITTED: July 17, 1958

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66261

~~24(6)~~ 24.7600, 9.3120 SOV/181-1-7-17/21

AUTHORS: Bronsteyn, I. M., Segal', R. B.

TITLE: The Secondary Electronic Emission of Tellurium

PERIODICAL: Fizika tverdogo tela, 1959, Vol 1, Nr 7, p 1133 (USSR)

ABSTRACT: Tellurium is atomized on a platinum target and the coefficient σ of the secondary electronic emission was measured as a function of the energy of the primary electrons E_p. The result of measurement is graphically recorded; it differs considerably from the statements in reference 1. Within the limits E_p = 400 to 500 ev a maximum for σ = 1.22 occurs, whereas in reference 1 σ_{max} = 1.5 — 1.52 held within the range of 600 - 1000 ev. The $\sigma(E_p)$-curves for platinum, lead, germanium, and copper are in satisfactory agreement with publication data (Ref 2). There are 1 figure and 2 Soviet references.

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SUBMITTED: August 20, 1958

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~~9 (3)~~ 9.3120

AUTHORS: Bronshteyn, I. M., Segal', R. B. SOV/181-1-8-15/32

TITLE: Investigation of Electron Reflection From Some Metals

PERIODICAL: Fizika tverdogo tela, 1959, Vol 1, Nr 8, pp 1246 - 1249 (USSR)

ABSTRACT: The authors investigated the angular dependence of the coefficient η of inelastically scattered primary electrons, a subject which hitherto has not been dealt with at all. The secondary electron emission coefficient namely consists of the coefficient of slow secondary electrons δ and of η: $\sigma = \delta + \eta$. These inelastically scattered electrons may, according to L. N. Dobretsov (1) and T. L. Matskevich (Ref 1), play an important part in the production of slow true secondary electrons. The device consists of branchings for the target, an electron gun, molecule gun, and of a pump. The molybdenum target had the shape of a cylindrical basket with two plane bases made of tungsten and finely polished platinum. During work a vacuum of constantly at least $5 \cdot 10^{-8}$ torr was kept up by constant pumping-out. The electron beam was focused according to the glow of the willemite and by means of a Faraday cylinder. Accuracy of primary and secondary current measurement by means of separate galvanometers was ~ 0.3 to 0.5%. The curves are

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easily reproducible. The angular dependence of σ and η increases with rising primary electron energy E_p. Be has the highest angular dependence, which is characteristic of light elements. The curve ascertained by the authors for sprayed platinum runs somewhat higher (by about 10 to 15%) than the respective curve determined by Sternglass. However, the strong temperature dependence $\sigma(E_p)$ observed by Sternglass was not confirmed by the authors for platinum. The curves $\eta(E_p)$ with $\varphi = 0$ for Ag, Bi, W, and Be for the energy interval investigated here have been determined for the first time. For Ag, Bi, and W, these curves are in good agreement with the general scheme determined by Pulluel (Ref 2) and Sternglass (Ref 3). The course of $\eta(E_p)$ ascertained by T. L. Matskevich (Ref 7) for dielectrics has not yet been observed in the case of metals. Two diagrams illustrate the function $\delta(\eta)$ when the angle of incidence φ of the primary electron beam is measured for E_p = const. The relationship between δ and η is linear with $\delta = k\eta + A(E_p)$, where the constant A greatly depends

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on E_p. The slope of the straight line decreases slightly with increasing E_p, perhaps because the "efficiency" of non-elastically scattered primary electrons decreases with rising E_p with respect to the production of slow secondary electrons. By connecting all points corresponding to equal φ a curve is obtained all points of which characterize the secondary electron emission of the target for the respective E_p value in the $\delta\eta$ diagram. Description of secondary electron emission also gave data concerning the composition of the secondary electrons (δ and η). There are 7 figures and 7 references, 4 of which are Soviet.

ASSOCIATION: Leningradskiy gosudarstvennyy pedagogicheskiy institut im. A. I. Gertsena (Leningrad State Pedagogical Institute imeni A. I. Gertsen)

SUBMITTED: August 5, 1958

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~~24(6)~~ 24.7700

SOV/181-1-10-1/21

AUTHORS: Bronshteyn, I. M., Segal', R. B.

TITLE: Inelastic Electron Scattering and Emission of Secondary Electrons of Some Metals. I

PERIODICAL: Fizika tverdogo tela, 1959, Vol 1, Nr 10, pp 1489 - 1499 (USSR)

ABSTRACT: An evacuable glass bulb (experimental vacuum: $5 \cdot 10^{-8}$ torr) 170 mm wide is fitted with five long, cylindrical side arms, three of which contain molecule guns. An electron gun is housed within the fourth used to bombard the specimen holder in the bulb center (a platinum disk) with electrons. The electrons scattered there are gathered by a collector (inner wall of the glass flask) and conveyed to a sensitive ammeter. The molecule guns are used to vaporize Be, Bi, Ag, Ca, and Mg on the platinum disk. The range of primary electrons in the vaporized metals, the range of slow secondaries and other parameters related to inelastic electron scattering are measured for these layers. Each metal was separately investigated, several layers of one metal being vaporized on the disk in each experiment. The dependences $\sigma(E_p)$ and $\eta(E_p)$

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Inelastic Electron Scattering and Emission of Secondary Electrons of Some Metals. I SOV/181-1-10-1/21

(E_p = primary electron energy, σ = secondary electron emission coefficient; energy variation by the electron gun) were measured for all layers. For results of figures 2-6. The curves of the other metals are very similar to that of Be. Figures 7-8 illustrate the dependence $E_p = f(l)$ (l = range) of Be. For Be it assumes the form $l \sim E_p^n$, where $n \simeq 1.5$ for $E_p > 800$ ev. Figure 9 shows the diagram δ (measure of the number of slow secondaries) - η for Be (vaporized on platinum) at - 180°C. Figure 10 presents the same diagram for Be vaporized on silver. The regions of reflection in the two diagrams correspond with a layer thickness of $\sim$ 12 (Fig 9) and $\sim$ 14 (Fig 10) atomic layers. This is in agreement with the slow-electron range (0-15 ev) in Be. It holds: $\lambda \ll 10$ atomic layers for Ca, Mg $\ll 20$ atomic layers for Mg (Figs 12,13). The thickness of the layers to be measured was determined from the thickness of the standard layers which had been produced together with the former. The results of measurement

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66328

Inelastic Electron Scattering and Emission of Secondary Electrons of Some Metals. I SOV/181-1-10-1/21

obtained by Dobretsov and Matskevich are utilized for comparison. A microbalance developed by the VNII im. D. I. Mendeleyeva (All-Union Scientific Research Institute imeni D. I. Mendeleyev) was used for weighing. Dobretsov and Matskevich are referred to in this article. There are 13 figures, 2 tables, and 20 references, 9 of which are Soviet.

ASSOCIATION: Leningradskiy gosudarstvennyy pedagogicheskiy institut im. A. I. Gertsena (Leningrad State Pedagogical Institute imeni A. I. Gertsen)

4

SUBMITTED: August 20, 1958

66329

~~24(6)~~ 24.7700 SOV/181-1-10-2/21

AUTHORS: Bronshteyn, I. M., Segal', R. B.

TITLE: Inelastic Electron Scattering and Emission of Secondary Electrons of Some Metals. II

PERIODICAL: Fizika tverdogo tela, 1959, Vol 1, Nr 10, pp 1500 - 1508 (USSR)

ABSTRACT: This article, continued from Fizika tverdogo tela, 1959, Vol 1, Nr 10, pp 1489 - 1499, reports on the results of measurement obtained for the following metals: $\sigma(E_p)$ and $\eta(E_p)$ for Bi layers on beryllium. Layer thickness: 2.5-82.5 atomic layers and solid material (Figs 1-2). The dependence $1(E_p)$ for Bi (Fig 3). $\sigma(E_p)$ and $\eta(E_p)$ for silver layers on beryllium. Layer thickness: 1-190 atomic layers and solid material (Figs 4-5). Dependence $1(E_p)$ for Ag (Fig 6). Diagram δ-η for Bi and Ag layers on beryllium (Figs 7-8). Figures 9-10 show $\sigma(E_p)$ for Bi on platinum, and figure 11 the same for Bi on silver. The dependence $\sigma(E_p)$ for Ag on

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Inelastic Electron Scattering and Emission of Secondary Electrons of Some Metals. II SOV/181-1-10-2/21

platinum and bismuth, and for Bi on beryllium may be seen from figures 12, 13, and 15. The dependence $\eta(d)$ for Bi and Ag on beryllium (E_p = 600-3000 ev; - 180°C) is given in figures 14 and 16. The dependence $\sigma(d)$ for Ag on Be (E_p=600-3000 ev; -180°C) is illustrated in figure 17. For Ag $\lambda \ll 12$ up to 20 atomic layers. The total ionization range l for Bi is $\approx$ 25 atomic layers at $E_{p,max} \approx$ 800 ev, while it is $\approx$ 80 atomic layers for Ag. There are 17 figures, 2 tables, and 3 Soviet references.

ASSOCIATION: Leningradskiy gosudarstvennyy pedagogicheskiy institut im. A. I. Gertsena (Leningrad State Pedagogical Institute imeni A. I. Gertsen)

SUBMITTED: August 20, 1958

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65723

24.2500 SOV/139-59-2-22/30

AUTHORS: Bronshteyn, I.M. and Segal', R.B.

TITLE: Slowing-Down of Electrons in Calcium and Magnesium

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Fizika, 1959, Nr 2, pp 147-148 (USSR)

ABSTRACT: The paper presents data on the coefficient of secondary electron emission σ for thin layers of the metals deposited on platinum. Fig 1 shows how σ varies with E (the energy of the incident electrons) for platinum. Fig 2 shows similar curves for calcium on platinum; the thicknesses of the layers (in atomic diameters) are 36, 55 etc. Fig 3 gives the range ℓ as a function of E deduced from the results of Fig 2. Fig 4 and 5 give similar results for Mg. In general, the results agree well with those given by others. There are 5 figures and 8 references, 6 of which are Soviet and 2 English.

ASSOCIATION: Leningradskiy gosudarstvennyy pedinstitut imeni A.I.Gertsena (Leningrad State Pedagogical Institute imeni A.I. Gertsen)

SUBMITTED: July 7, 1958

Card 1/1

.24.2500 .

65724
SOV/139-59-2-23/30

AUTHORS: Bronshteyn, I.M. and Segal', R.B.

TITLE: The Derivation of Electron Ranges from Secondary Emission Results

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Fizika, 1959, Nr 2, pp 149-152 (USSR)

ABSTRACT: The paper deals with the various possible sources of error in such measurements. Fig 1 collects the published data for the thicknesses needed to give the true value of σ as functions of E for various metals. Fig 2 gives data for Bi deposited on Be at 0.25 atomic layer/min (see previous paper for explanation); Fig 3 differs from Fig 2 only in that the Bi has been deposited at 5 atomic layers/min. It is concluded that the causes of error in many papers are 1) that very thin layers may not be continuous; 2) that care must be taken to ensure that the true σ has been reached; 3) that proper use has not been made of checks based on the inelastic scattering coefficient. There are 3 figures, and 8 references, 6 of which are Soviet and 2 English.

ASSOCIATION: Leningradskiy gosdarstvennyy pedinstitut imeni

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65724

SOV/139-59-2-23/30

The Derivation of Electron Ranges from Secondary Emission Results

A.I.Gertsena (Leningrad State Pedag. Institute imeni A.I.Gertsen)

SUBMITTED: July 7, 1958

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SOV/109- - 4-3-36/38

AUTHORS: Bronshteyn, I.M., and Segal', R.B.

TITLE: Secondary Electron Emission of Calcium (Vtorichnaya elektronnaya emissiya kal'tsiya)

PERIODICAL: Radiotekhnika i Elektronika, Vol 4, Nr 3, 1959, pp 551-552 (USSR)

ABSTRACT: It is known that the secondary electron emission coefficient of alkali and rare earth metals is a function of the thickness of the emissive layer (Refs 1-5). As the thickness of the metal layer is gradually increased, the emission coefficient σ increases to a maximum and then decreases to the value corresponding to the electron emission of a pure metal. The work described was concerned with the investigation of σ of a platinum base coated with a layer of calcium. The authors also determined the dependence of σ on the energy of the primary electrons E_p for a thick layer of calcium. Fig 1 contains a family of curves $\sigma(E_p)$ for the layers of calcium of different thicknesses deposited on to a platinum base; Curve (1) corresponds to pure platinum, while Curve (10) is for a thick layer of calcium.

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SOV/109- - -4-3-36/38

Secondary Electron Emission of Calcium

The remaining curves are for the films whose thicknesses range from 0.2 to 78 atomic layers. From Fig 1 it is found that the maximum σ is obtained at the film thickness of 0.6 atomic layers.

There are 2 figures and 10 references, 5 of which are Soviet, 3 English, 1 French and 1 German.

Card 2/2

SUBMITTED: September 8, 1958

S/181/60/002/01/21/035
B008/B014

AUTHORS: Bronshteyn, I. M., Segal', R. B.

TITLE: Secondary Electron Emission 21 of Thin Metal Foils 21 on an Activated Base

PERIODICAL: Fizika tverdogo tela, 1960, Vol. 2, No. 1, pp. 93-95

TEXT: The results published in Ref. 2 were checked by means of activated bases. It was shown that non-elastically reflected electrons played the most important part in the development of secondary electron emission. The authors used the same technique and instruments as described in Ref. 2. The functions $\sigma(E_p)$ and $\eta(E_p)$ of the coefficient of secondary electron emission for differently thick nickel layers on a silver-beryllium base are shown in Figs. 1a and b (η - coefficient of non-elastic reflection). When the nickel foil becomes thicker, $\sigma(E_p)$ and $\eta(E_p)$ approach the corresponding limits of nickel, thinner foils being necessary for smaller E_p. Nickel dust was applied to a hot base ($t \simeq 50^{\circ}$C). Similar

VC

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Secondary Electron Emission of Thin Metal Foils on an Activated Base

S/181/60/002/01/21/035
B008/B014

observations were made when bismuth dust was applied to a cold aluminum foil ($t \simeq -180^{\circ}C$) (Figs. 2a and 2b). The dependence of the coefficient of secondary electron emission on the thickness of the foils d for E_p = const is illustrated in Fig. 3. Fig. 4 shows the ($\delta - \eta$) curves obtained for nickel foils applied to a silver-beryllium base ($\delta = \sigma - \eta$). An equally thick nickel foil corresponds to the minima of these curves for all E_p = const. Fig. 5 shows the dependences of the coefficient of secondary electron emission $\sigma(E_p)$ for the application of bismuth foils of different thicknesses to an activated aluminum-magnesium base at room temperature. The results obtained from the application of metallic dust to an activated base correspond to the conclusions drawn from the dusting of pure metallic bases. Mention is made of M. M. Vudynskiy's observations. There are 5 figures and 4 references, 3 of which are Soviet.

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Card 2/3

Secondary Electron Emission of Thin Metal Foils on an Activated Base

S/181/60/002/01/21/035
B008/B014

ASSOCIATION: Leningradskiy gosudarstvennyy pedagogicheskiy institut im. A. I. Gertsena (Leningrad State Pedagogical Institute imeni A. I. Gertsen)

SUBMITTED: March 20, 1959

√C

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21588

S/109/60/005/010/011/031
E032/E114

26.7531

AUTHORS: Bronshteyn, I.M., and Shchuchinskiy, Ya.M.

TITLE: Energy spectrum of slow secondary electrons from barium adsorbed on tungsten

PERIODICAL: Radiotekhnika i elektronika, Vol.5, No.10, 1960, pp. 1650-1657

TEXT: This paper was first read at the 9th All-Union Conference on Cathode Electronics in Moscow, October 1959. The aim of the present work was to investigate the effect of changes in the work function on the energy spectrum of slow secondary electrons emitted during the adsorption of barium on tungsten. The measurements were carried out with the aid of the apparatus shown in Fig.1. In this figure, M is the target, K is the collector, C is a grid, $Э_1$ is an electron gun, $Э_2$ is an electron gun used in the determination of the change in the work function of the target, and MП are molecular beam sources. The barium layers were deposited on to the target outside the spherical container so that the surface of the collector K remained the same throughout. The spherical part of the instrument

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E032/E114

Energy spectrum of slow secondary electrons from barium adsorbed on tungsten

was placed between Helmholtz coils which were used to ensure that there was no magnetic field in the region of the spherical bulb. The grid C was used to suppress tertiary electrons. The electron gun $Э_1$ produced a well-focussed beam of primary electrons in the energy range 20-3000 eV. The second electron gun is similar to that described by the present authors in Ref.6 and gave a well-focussed slow electron beam (6-10 eV). The work function of the target was measured by the Anderson method (Ref.7: Phys.Rev., 1935, 47, 958) from the displacement of the volt/ampere curves. The molecular beam sources were used to evaporate the barium layers on to the target. The latter was cylindrical in form and was made of tantalum (diameter 15 mm, length 10 mm). The cylinder was terminated at its lower end in a tungsten wall (0.1 mm). This wall was in the form of a section of a sphere (height 2 mm). The target was fixed at the end of a molybdenum rod and its position was adjustable. All the measurements were carried out in vacuum produced by two mercury diffusion pumps
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S/109/60/005/010/011/031
Energy spectrum of slow secondary... E032/E114

isolated by three liquid oxygen traps. In addition, a titanium pump was incorporated in the apparatus. The instrument was first outgased for 4-7 days both by baking and electron bombardment. The final vacuum was 10^{-8} mm Hg. The secondary electron distribution curve was determined in 20-30 sec so that the barium layer could not become contaminated by residual gas atoms (time of adsorption of a monolayer of residual gas was estimated at 200 sec). The secondary emission coefficient was measured with the aid of two galvanometers (10^{-10} amp/mm). One of them was used to obtain the volt/ampere curves in order to determine the change in the work function of the target. The secondary electron energy distributions were exhibited on an oscillograph screen with preliminary differentiation of the signal. The energy distribution curves were obtained for various barium deposits between 0.3 and 10 atomic layers thick. It was shown that the form of the energy distribution curve depends on the thickness of the barium layer. Instead of the one-maximum characteristic of pure tungsten, two maxima appear. It is suggested that one of these (at about 3.1 eV) is due to secondary electrons from the tungsten base and the second is due to

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S/109/60/005/010/011/031

Energy spectrum of slow secondary ... E032/E114

the barium layer. The tungsten maximum disappears when the barium deposit reaches a thickness of 10 atomic layers. The position of the maximum due to barium is well accounted for by the theory of N.L. Yasnopol'skiy and G.A. Tyagunov (Ref.4) and A.Ye.Kadyshevich (Ref.5). It is clear from the distributions obtained that as the work function decreases the maximum due to barium moves towards lower energies. The position of the maximum of the curves remains roughly unaltered for deposits thicker than about 2 atomic layers (the maximum occurs at between 1.6 and 1.7 eV). The peak disappears altogether for layers in excess of 10 atomic layers.

Acknowledgements are expressed to M.L. Kapitsa for his advice.

There are 9 figures, 2 tables and 12 references: 10 Soviet and 2 English.

SUBMITTED: December 21, 1959

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S/109/60/005/010/011/031
E032/E114

Energy spectrum of slow secondary electrons from barium adsorbed on tungsten

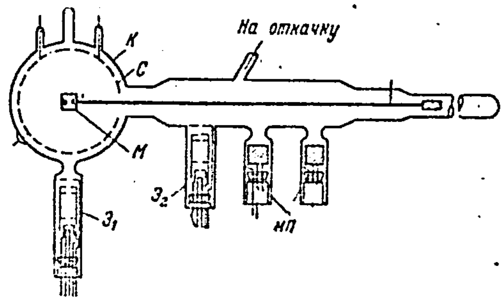

Fig.1

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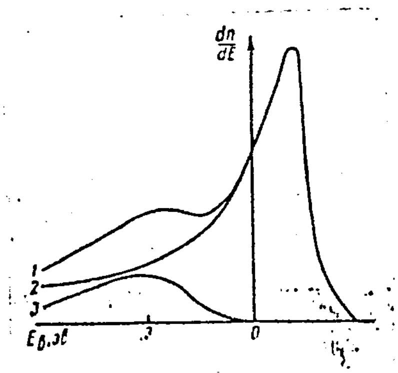
/109/60/005/010/011/031

Energy spectrum of slow secondary... S032/E114

Legend to Fig.7 Energy distribution of secondary electrons 1 - tungsten target with Ba deposit (thickness $\theta \simeq 0.7$ of monolayer; 2 - $\theta \gg 1$; 3 - difference between curves 1 and 2.

Fig.7



Card 6/6

BRONSHTEY, I.M.; SEGAL', R.B.

Nonelastic scattering of electrons from oxidized metal surfaces.
Radiotekh. i elektron. 5 no.10:1741-1742 O '60. (MIRA 13:10)
(Electrons--Scattering) (Secondary electron emission)

86828

9.4300(3203,1043,1143) S/020/60/135/005/016/043
26.1632 B019/B067

AUTHORS: Bronshteyn, I. M., Frayman, B. S.

TITLE: Some Rules Governing the Emission of Secondary Electrons From Thin Metal and Semiconductor Layers

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 135, No. 5, pp. 1097-1100

TEXT: The authors studied secondary electron emission of Be, Bi, Ag, and Pt. The length of path of slow secondary electrons and the effectivity S of inelastically reflected electrons in the production of slow secondary electrons were determined by means of "equivalent" base layers and δ-η diagrams. δ and η are the coefficients of secondary electron emission of slow secondary electrons and fast elastically and inelastically reflected electrons. The authors study possible forms of coupling between δ and η by applying thin layers of one substance to the base layer of another. Measurements were made at $-180°C$ in vacuo at approximately $5 \cdot 10^{-8}$ mm Hg. Control tests at $(4-5) \cdot 10^{-9}$ mm Hg showed that the coefficient

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86828

Some Rules Governing the Emission of Secondary Electrons From Thin Metal and Semiconductor Layers

S/020/60/135/005/016/043
B019/B067

η of inelastically reflected electrons is less pressure-dependent than the coefficient δ of secondary electron emission of slow electrons. Results are graphically represented in Figs. 3 and 4. It was found that if the efficiency of the evaporated layer and the base layer are known, the dependence $\delta(\eta)$ may be predicted, hence also the coefficient of secondary electron emission $\sigma(d)$, where d denotes the thickness of layer. The authors thank Professor M. S. Kosman and Professor A. R. Regel' for their interest and discussions. There are 4 figures and 1 Soviet reference.

ASSOCIATION: Leningradskiy gosudarstvennyy pedagogicheskiy institut im. A. I. Gertsena (Leningrad State Pedagogical Institute imeni A. I. Gertsen)

PRESENTED: June 22, 1960, by A. F. Ioffe, Academician

SUBMITTED: June 17, 1960

22047

24,6600(1057, 1482)
26.1640

S/181/61/003/004/013/030
B102/B214

AUTHORS: Bronshteyn, I. M. and Frayman, B. S.

TITLE: Path of kilovolt electrons in solid bodies

PERIODICAL: Fizika tverdogo tela, v. 3, no. 4, 1961, 1122-1124

TEXT: E. J. Sternglass (Phys. Rev. 95, 345, 1954) has shown that the inelastic reflection coefficient η of kv electrons by solid bodies depends in a quite definite way on the atomic number Z of the element: First, η increases linearly with Z; at Z = 25-30 the curve has a bend and the further increase is only small but again linear. Therefore, it is to be assumed that, at electron energies greater than 1 kev, the total energy of the electrons is inversely proportional to Z. It is shown here that this in fact is the case. The ranges, l, of the electrons were measured by the method of thin layers; one has $l = kE_p^m$, where m = 1.3-1.5, and k is a coefficient depending on the material properties. The figure shows besides $\eta(Z)$ the function l(Z) for E_p = 3 kev, where l is the path length in cm divided by the atomic volume A/ϱ (A - atomic weight, ϱ - density) of a given element

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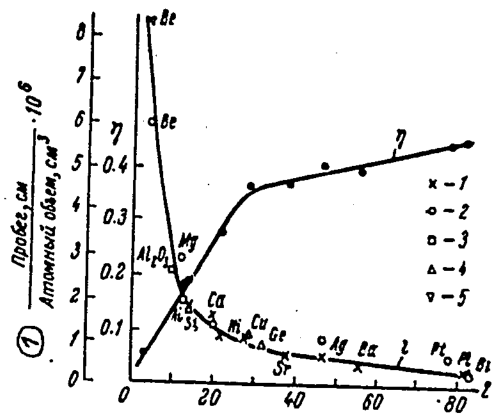
($l = l'\varrho/A$). In these coordinates, $l(Z)$ shows a hyperbolic form and can be described by $l = 2.8\cdot10^{-5}/Z$. If the energy (in kev) is considered, $l = \frac{6\cdot10^{-6}}{Z} E_p^{1.4}$. ($m = 1.4$ was taken as the mean of 1.3-1.5). The divergence between formula and experiment does not exceed the error of measurement. There are 1 figure and 8 references: 4 Soviet-bloc and 4 non-Soviet-bloc. The most important reference to English-language publications reads as follows: J. R. Young, J. Appl. Phys. 27, 1, 1956 and 28, 524, 1957.

ASSOCIATION: Leningradskiy gosudarstvennyy institut im. Gertsena (Leningrad State Institute imeni Gertsen)

SUBMITTED: July 14, 1960

Path of ...

Figure



Card 3/3

S/181/61/003/005/010/042
B101/B214

9.4300(1164,1138,1395)

AUTHORS: Bronshteyn, I. M., Frayman, B. S.

TITLE: The problem of determining the path length of slow true secondary electrons

PERIODICAL: Fizika tverdogo tela, v. 3, no. 5, 1961, 1371-1372

TEXT: It has been shown in Ref. 1 (I. M. Bronshteyn, R. Ye. Segal', DAN SSSR, 123, 639, 1958) that the path length λ of slow secondary electrons in metal A can be determined by studying the secondary electron emission of thin layers of metal A increasing in thickness placed on an "equivalent" base of metal B. This method was used to determine the path lengths of slow secondary electrons in Bi, Ag, and Pt, and from the breaks of the curves E_p = const. in the δ, η diagram the path length in Be (Ref. 2: FTT, 1, 1489, 1959). For all metals investigated λ was of the same order of magnitude and did not exceed 8-12 atom layers. In the present work, the path lengths of slow secondary electrons were determined in Ca, Ba, and Be. The oxidized surfaces of Ca, Ba, and Be, respectively, were used as base layers

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($\eta_{layer} \propto \eta_{base\ layer}$; $\sigma_{layer} \neq \sigma_{base\ layer}$), as in this way there was a change neither in the character of the curves $\eta(E_p)$ (Ref. 3: Radiotekhn. i elektron. 5, 1471, 1960) nor in the values of η (Fig. a). The oxidation of Ba and Ca was done by a 3-5 minute long reduction of the vacuum to 10^{-3} mm Hg while the oxidation of Be was done by one minute contact with the atmosphere. Even in the most unfavorable case of the oxidation of Be where on account of the low value of η_{Be} the change in the conditions of electron scattering at the surface layer can lead to important changes of η, this change did not exceed 20% while δ was changed by 6-7 times. For the control of the results Ba was laid to Ag, and Ca to Ti ($\eta_{Ba} \propto \eta_{Ag}$; $\eta_{Ca} \propto \eta_{Ti}$). The thickness of the Ba and Ca layers were measured from the change of the coefficient of the secondary electron emission on adsorption in Mo. As shown by H. de Boer, and H. Bruining (Ref. 4: Physica, 6, 941, 1939) the photocurrent and σ for E_p = constant reach practically simultaneously the maxima at optimal thickness of the layer which can be set as $d \simeq 0.7$ atom layers (Ref. 5: V. M. Gavrilyuk, Ukr. fiz. zhurn., 1, 73, 1936). On adsorption of Ba by Ag, and

Ca by Ti σ reaches the maximum for the same values of d. Figs. 6, 5, 2 show the curves $\sigma(E_p)$ on adsorption by Be, Ba, and Ca, respectively. It is found that the curves are displaced in parallel and for all E_p simultaneously the same position is reached for thickness of 10 atom layers as is characteristic for massive layers of Be, Ba, and Ca. This agrees well with the data obtained in Ref. 2 by another method. [Abstracter's note: Complete translation]. There are 1 figure and 5 references: 4 Soviet-bloc and 1 non-Soviet-bloc.

ASSOCIATION: Leningradskiy gosudarstvennyy pedagogicheskiy institut im. A. I. Gertsena, fizicheskiy fakul'tet (Leningrad State Pedagogical Institute imeni A. I. Gertsen, Department of Physics)

SUBMITTED: April 6, 1960 (initially); December 26, 1960 (after revision)

23105

BRONSHTEYN, I.M.; FRAYMAN, B.S.

Nonelastic electron scattering and secondary electron emission of certain metals and semiconductors. Fiz. tver. tela 3 no.6:1638-1649 Je '61. (MIRA 14:7)

1. Leningradskiy gosudarstvennyy pedagogicheskiy institut im. A.I.Gertsena.
(Electrons--Scattering) (Secondary electron emission)
(Semiconductors)

BRONSHTEYN, I.M.; FRAYMAN, B.S.

Secondary electron emission from certain solids. Fiz. tver. tela 3 no.9:2859-2860 S '61. (MIRA 14:9)

1. Leningradskiy gosudarstvennyy pedagogicheskiy institut imeni A.I. Gertsena.

(Secondary electron emission)

BRONSHTEYN, I.M.; FRAYMAN, B.S.

Secondary-emission properties of metals and semiconductors, and the periodic table. Fiz.tver.tela 3 no.10:3220-3223 O '61. (MIRA 14:10)

1. Leningradskiy gosudarstvennyy pedagogicheskiy institut imeni A.I.Gertsena.
(Secondary electron emission) (Periodic law)

BRONSHTEYN, I.M.; SHCHUCHINSKIY, Ya.M.

Energy spectrum of slow secondary electrons in the adsorption of Be on W. Radiotekh. i elektron. 6 no.4:670 Ap '61. (MIRA 14:3)
(Secondary electron emission)(Beryllium)(Tungsten)

S/109/61/006/010/025/027
D201/D302

AUTHORS: Bronshteyn, I.M., and Frayman, B.S.

TITLE: Secondary and photo-emission during the adsorption of beryllium and silver at barium

PERIODICAL: Radiotekhnika i elektronika, v. 6, no. 10, 1961, 1769 - 1770

TEXT: In the present short communication the results of experimental determination of the photo-electric current and of σ are given, taken during the adsorption of Be and Ag atoms at the surface of barium. The results show that the work function decreases for an optimum thickness of coating. Measurements of the coefficient of secondary emission σ during the adsorption of Ba at the silver surface were carried out in vacuum 5×10^{-8} and 4×10^{-9} mm Hg. It was found that σ for Ba and Ag and $\sigma(d)$ did not depend, within the measurement errors, on the vacuum (d - thickness of coating). The results of the experiment are given in graphic form, from which it

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may be seen that the work function of the underlayer decreases not only during adsorption of atoms of electropositive atoms, but also during that of electronegative metals. This effect cannot be explained by the formation of a double layer at the metal surface. It seems that the decrease in the work function during adsorption of electronegative metal atoms could be explained by the field of spots existing over a mottled surface. There are 3 figures and references: 3 Soviet-bloc and 1 non-Soviet-bloc. This report was

PRESENTED: at the Mezhduvedomstvennyy seminar po katodnoy elektronike (Inter-Departmental Cathode Electronics Seminar) on February 6, 1961

SUBMITTED: February 4, 1961

41934
S/194/62/000/009/041/100
D256/D308

9.3120
26.2312

AUTHORS: Bronshteyn, I. M. and Shuchinskiy, Ya. M.

TITLE: Effect of the electron work function on the secondary electron emission from metals

PERIODICAL: Referativnyy zhurnal, Avtomatika i radioelektronika, no. 9, 1962, 4, abstract 9-3-7 k (Zap. Leningr. gorn. in-ta, 1959 (1961), v. 37, no. 4, 98-104)

TEXT: The investigation concerned the effect of the changes of the electron work function of the target on the coefficient of the secondary emission, as well as on the velocity distribution curves for slow secondary electrons. Changes in the work function of the target were determined during gradual adsorption of barium atoms, taking into account the target-collector contact potential difference. The experimental apparatus consists of a spherical condenser in which the measurements were performed, a long cylindrical tube equipped with branch pieces for the molecular guns, and an electron gun for the determination of the electron work function chan-

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ges. The electron gun in the measuring part of the apparatus produced a well focused beam of electrons in the energy range 20 to 3000 eV. An electron gun producing a well focused beam of slow electrons of 6 to 10 eV was placed in one of the branch pieces of the second part of the apparatus; from the observed shift of the volt-ampere curves it was possible to determine the changes in the work function. The target was mounted on a molybdenum rod of 2 mm diameter; a steel cylinder, sealed in a glass ampoule, was mounted at the opposite end of the rod. The target was moved by means of an electromagnet. A differentiating arrangement was used to determine the energy distribution curves for the secondary electrons. The apparatus was continuously evacuated during the measurements by two mercury diffusion pumps in series via 3 liquid oxygen traps. Degassing and long-period ageing was carried out for 4 to 7 days, so that the residual gas pressure did not exceed 10^{-8} mm Hg during measurement. It is shown that the coefficient of the secondary emission σ increases with decreasing electron work function φ of the target. σ_{max} corresponds to φ_{min}, i.e. ~0.7 of the monatomic layer of barium on the tungsten target. With further increase in the quantity of barium adsorbed on the tungsten target the work function of the target increases and the coefficient of the secondary emission decreases, until σ and φ reach values that are characteristic of a thick barium layer. 8 references. [Abstracter's note: Complete translation.]

37727

26.1420

S/139/62/000/002/027/028
E039/E435

AUTHORS: Bronshteyn, I.M., Frayman, B.S.

TITLE: On the question of "boundary" energy of slow true secondary electrons

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Fizika. no.2, 1962, 172-173

TEXT: It is usually assumed that the spectrum of secondary electrons has two parts, that due to slow true secondary electrons δ and the fast inelastically and elastically reflected primary electrons η. As a maximum "boundary" energy for true slow secondary electrons a value $E_2 = 50$ eV is usually assumed, although a sharp division between the two groups is not possible. It is shown in an earlier paper that for metals the δ part of the spectrum is formed in a surface layer $\sim 10^{-7}$ cm thick. Curves are presented showing $\eta(E_p)$ (E_p is the energy of the primary electrons) for clean and for oxidized surfaces of Ba, Ca and Be. The results are the same for both conditions in the case of Ba and Ca while the values of η for oxidized Be are slightly greater than for the pure metal. Delay curves are also plotted

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On the question of "boundary" ... S/139/62/000/002/027/028
E039/E435

for clean and oxidized surfaces of Ba, Ca and Be. For Ba and Ca the curves for the two conditions converge at E_2 = 45 to 50 eV but for Be they run parallel for $E_2 > 50$ eV. The "boundary" energy E_2 does not depend on E_p over the range 200 to 4000 eV. There is 1 figure.

ASSOCIATION: Leningradskiy gospedinstitut imeni A.I.Gertsena
(Leningrad State Pedagogical Institute imeni A.I.Gertsen)

SUBMITTED: January 25, 1961

Card 2/2

40640

9,3120
26.2531 (also 3016)

S/139/62/000/004/017/018
E039/E420

AUTHORS: Bronshteyn, I.M., Shchuchinskiy, Ya.M.

TITLE: The energy spectrum of slow secondary electrons by adsorption for thin layers of silicon and platinum on beryllium

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Fizika, no.4, 1962, 182 + 1 plate

TEXT: The apparatus, technique and experimental method were previously described by the present authors (Radiotekhnika i elektronika, v.5, 1960,*1650). It is shown that with an increase in the degree of covering θ (θ is the number of atomic layers) the shape of the spectrum and the position of its maximum changes until $\theta \approx 2$ both for silicon and platinum. For silicon the maximum in the energy distribution curve (0 to 10 eV) occurs at 2.3 to 2.4 eV and for platinum (0 to 15 eV) at 3.3 eV. The form of the energy spectrum at $\theta \approx 10$ for silicon corresponds to that of silicon itself. Similarly it is shown that for $\theta \approx 2$ the emissive power of platinum on beryllium is determined almost entirely by the parts covered with platinum. The position of the

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*S/109/60/005/010/011/031

maxima for beryllium (1.8 to 1.9 eV) and for platinum are in good agreement with data published in earlier papers in which the energy spectra were obtained from differential delay curves. There are 2 figures.

ASSOCIATION: Leningradskiy gornyy institut imeni G.V.Plekhanova (Leningrad Mining Institute imeni G.V.Plekhanov)

SUBMITTED: May 30, 1961

24,2312
?.1?0 (1138,1160,1331)

34247
S/181/62/004/002/042/051
B102/B138

AUTHORS: Bronshteyn, I. M., and Shchuchinskiy, Ya. M.

TITLE: Secondary electron emission from potassium and calcium

PERIODICAL: Fizika tverdogo tela, v. 4, no. 2, 1962, 552 - 553

TEXT: The dependence of the coefficient of secondary electron emission on the primary electron energy, $\sigma(E_p)$, was measured for K and Ca. For K the components $\delta(E_p)$ and $\eta(E_p)$ were also determined ($\sigma = \delta + \eta$; δ is the coefficient of true secondary emission of slow electrons, and η is that of inelastically reflected electrons). A spherical capacitor with anti-dynatron grid was used for the measurements. Ca was evaporated from Ta and K from a glass ampoule. The collector (grid) diameter was 80 mm. The measurements were made immediately after condensing the K or Ca onto the tungsten backing; the curves obtained were found to be well reproducible. For K, σ_{max} was 0.53 at E_p = 175 ev, for Ca, σ_{max} = 0.6 at E_p = 200 ev. There are 1 figure and 6 Soviet references.

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34247
S/181/62/004/002/042/051
B102/B138

econdary electron emission...

ASSOCIATION: Gornyy institut im. G. V. Plekhanova Leningrad (Mining Institute imeni G. V. Plekhanov, Leningrad)

SUBMITTED: October 30, 1961

Fig. $\sigma(E_p)$, $\eta(E_p)$ and $\delta(E_p)$ for K and $\sigma(E_p)$ for Ca. dashed line: $\sigma(E_p)$ for K, old measurements (1941).

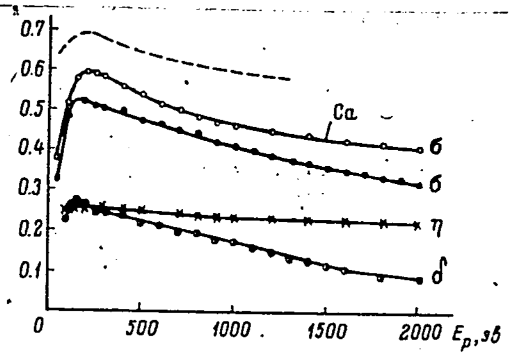

Fig.

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39964

24,6820

S/181/62/004/008/007/041
B125/B104

AUTHORS: Bronshteyn, I. M., and Kovalenko, V. S.

TITLE: Energy distribution of inelastically scattered electrons in solids

PERIODICAL: Fizika tverdogo tela, v. 4, no. 8, 1962, 2047-2049

TEXT: The energy distribution of electrons inelastically scattered in Al, Ni, Ag, and Pb was investigated using a quasi-spherical capacitor with a suppressor grid. Layers of these metals were condensed in vacuo on a glass pin. Complete curves for the slowing down and the energy distribution of inelastically scattered electrons of sharply focused beams (~2 mm in diameter) with energies of 0.6, 0.9, 1.5, and 3 kev were plotted for the energy range $50 \leqslant E \leqslant E_p$ and with particular accuracy for $E_p \pm 10$ ev. Fig. 6 shows the energy distribution for $E_p = 1.5$ kev. Similar results were obtained for $E_p = 3$ kev. At all these energies there occur also elastically scattered electrons, but their number diminishes with increasing

4

Card 1/2

E_p. The proportion of elastically scattered electrons amounts to 2-4 % of the total number of electrons and up to 14 % of all high-energy electrons (up to 50 ev). The form of the energy distribution shown in Fig. 5 is due to inelastic electron scattering at various depths in the scatterer. The fastest electrons were scattered in the layers near the surface of the scatterer. There are 2 figures.

ASSOCIATION: Leningradskiy gosudarstvennyy pedagogicheskiy institut im. A. I. Gertsena (Leningrad State Pedagogical Institute imeni A. I. Gertsen)

SUBMITTED: February 22, 1962

Fig. 5. Energy distribution of inelastically reflected electrons. The areas behave like the coefficients η of inelastically reflected electrons. For Be and Al the scale on the coordinate axis is three times larger than for Ag, Ni, and Pb. (1) Be; (2) Al; (3) Ni; (4) Ag; (5) Pb.

34499
S/109/62/007/002/024/024
D256/D303

26.2312
24.7700 (1160, 1164, 1385)

AUTHOR: Bronshteyn, I.M., and Shchuchinskiy, Ya.M.

TITLE: Energy spectrum of slow secondary electrons accompanying barium absorption by silicon and beryllium

PERIODICAL: Radiotekhnika i elektronika, v. 7, no. 2, 1962, 356 - 359

TEXT: The study was conducted in order to verify and supplement the authors' previous work (Ref. 1: Radiotekhnika i elektronika, v. 5, no. 10, 1960, 1650) where two groups of slow secondary electrons were observed in evaporation of thin layers of barium upon a tungsten backing. The results, however, were difficult to interprete owing to the fact that the electron inelastic scattering coeffs. η for barium and tungsten are too close to each other, and for this reason elements with widely differing η and secondary electron emission coeff. σ were chosen for the present investigation, the experimental method being identical to that reported previously. The results are presented in a form of $\sigma(E_p)$ and $\sigma(\theta)$ curves as well as

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4

the energy spectra of the slow secondary electrons for various thicknesses θ. The spectra are different in character using silicon and beryllium backing; for silicon two peaks appear at a thickness of barium $\theta \simeq 1$ to 2 atomic layers, and at $\theta = \lambda = 12$ atomic layers the shape of the spectrum is that of pure barium (λ = zone of emission of slow electrons in barium); for beryllium backing the peaks are absent. This pattern is explained by the relative magnitudes of the secondary electron emission coeff. σ: σ for beryllium is smaller than for barium, while for silicon it is larger than for barium. It is shown that the maximum of the spectrum becomes established at $\theta \simeq 2$ atomic layers and its shape at $\theta \simeq \lambda$, irrespective of σ and η. This result agrees with the previous investigations. It is suggested that in order to obtain two peaks in the slow electron spectrum the following conditions should be fulfilled: 1) The instrument should be provided with an anti-dynatron electrode to cut off spurious electrons from the collector; 2) The electron work functions of the layers and the backing should be different, i.e. a sufficient difference in the contact potentials is essential; 3) The true coeff. of the secondary electron emission of the layer should

Energy spectrum of slow secondary ... S/109/62/007/002/024/024
D256/D303

be smaller than that of the backing. The advice obtained from N. L. Yasnopol'skiy is acknowledged by the authors. There are 3 figures and 4 Soviet-bloc references.

SUBMITTED: July 22, 1961

Card 3/3

40407
S/109/62/007/009/016/018
D409/D301

9.3120
26.2312

AUTHORS: Bronshteyn, I.M., and Frayman, B.S.

TITLE: Inelastic scattering and secondary emission of electrons from solids

PERIODICAL: Radiotekhnika i elektronika, v. 7, no. 9, 1962, 1643 - 1648

TEXT: The free path of medium-energy electrons of Ni, Cu, Ga, Tl, Sn, Ge, Sr, Ag, In, is determined. The role of inelastically-scattered electrons in the secondary emission from Ga, Ge, Sr, In, Sn and Tl, is estimated. The experimental procedure was described by the authors in the references. The free path l was determined from the diagram $\eta(E_p)$, where η is the coefficient of secondary emission of fast electrons and E_p the energy of primary electrons. For all the investigated elements, the free path can be approximated by the formula

$$l_p = kE_p^n \quad (1)$$

Card 1/2

where k and n are constants which are characteristic of each element. As an example, the family of curves $\eta_d(E_p)$ is given, obtained by spraying Sn and Sr on a Be-base. The role of inelastically-scattered electrons in the secondary emission, was determined from the $\delta - \lambda$ diagram (δ being the secondary-emission coefficient of slow electrons), obtained by spraying Sr on Be. It was found that a change in the work function of the target leads only to a twofold increase in the slow component of secondary emission (δ), whereas the fast component (η) is not affected. The secondary-emission parameter S (the efficiency of "inverse" electrons) is constant for a given element and does not depend on the properties of the base material. This can be interpreted as follows: With a layer thickness $d \geqslant \lambda$, (λ denoting the region of outflow of slow secondary-electrons), the shape of the energy-distribution curve of inelastically-scattered electrons is practically determined by the properties of the coating material, and not of the base. In the region $d > \lambda$, the shape of the energy-distribution curve does not change with increasing d; only the relative number of inelastically-scattered electrons varies with the coefficient η. There are 10 figures.

SUBMITTED: March 19, 1962

ACCESSION NR: AP4041687 S/0181/64/006/007/1921/1924

AUTHORS: Bronshteyn, I. M.; Denisov, S. S.

TITLE: Influence of the work function on the parameters of secondary electron emission

SOURCE: Fizika tverdogo tela, v. 6, no. 7, 1964, 1921-1924

TOPIC TAGS: work function, beryllium, secondary electron, secondary emission, inelastic scattering, electron emission

ABSTRACT: The authors elaborate on earlier investigations by one of the authors (I. M. Bronshteyn and B. S. Frayman, DAN SSSR, v. 135, 1097, 1960; FTT v. 3, 1638 (1961); Radiotekhn. i elektron. v. 7, 1643, 1962). The earlier investigations have shown that the variation of the target work function leads only to the slow part δ of the coefficient of secondary electron emission, but not on the fast part η. Since δ is characterized by three other parameters (δ_0 --

ACCESSION NR: AP4041687

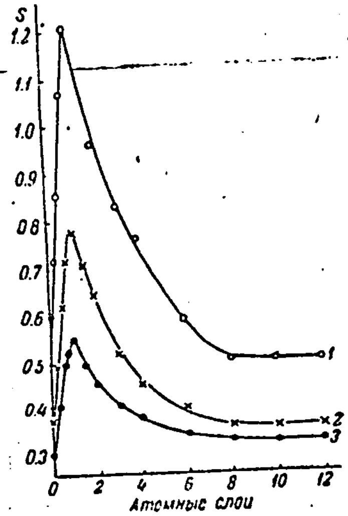
effectiveness of primary electrons, S -- effectiveness of inelastically reflected electrons, and λ -- depth of the zone of emergence of the secondary electrons, the authors investigated the response of these parameters in beryllium to variation of the work function. Using the method and procedure of the $\delta - \eta$ diagram, which were described in detail in the already cited references, they found that decrease in the work function increases S and δ_0, and only δ_0 and S are affected, but not the value of λ. This indicates that the slow secondary electrons are for the most part absorbed rather than slowed down inside the secondary electron emergence zone. Orig. art. has: 4 figures.

ASSOCIATION: Leningradskiy gosudarstvenny*y pedagogicheskiy institut im. A. I. Gertsena (Leningrad State Pedagogical Institute)

SUBMITTED: 18Oct63 DATE ACQ: ENCL: 02

SUB CODE: NP NR REF SOV: 006 OTHER: 000

Card 2/4

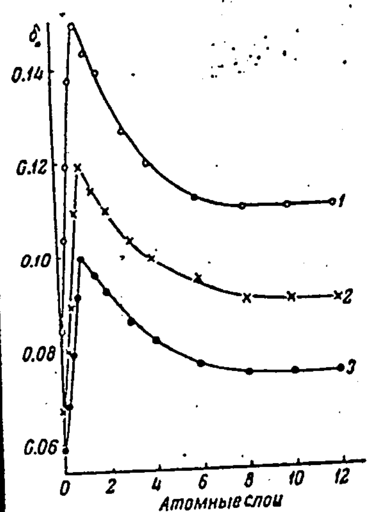


Atomic layers

Dependence of efficiency S(d) of inelastically reflected electrons on degree of covering of the beryllium with adsorbed barium atoms

1 - E_p = 2 keV, 2 - 3, 3 - 4

ACCESSION NR: AP4041687 ENCLOSURE: 02



The same as in Enc. 01, for the efficiency of the primary electrons

Atomic layers

Card 4/4

L 10765-65 EWT(1)/EPA(w)-2/EEC(t)/EEC(b)-2 Pab-24 AS(mp)-2/ESD(dp)/SSD/ FSD(t)/ESD(gs)/AFWL/ASD(a)-5/ESD(c)

ACCESSION NR: AP4044933 S/0181/64/006/009/2644/2649

AUTHORS: Bronshteyn, I. M.; Denisov, S. S.

TITLE: Inelastic scattering of electrons in solids for oblique incidence of the primary beam

SOURCE: Fizika tverdogo tela, v. 6, no. 9, 1964, 2644-2649

TOPIC TAGS: reflection coefficient, electron scattering, inelastic scattering, thin film, saturation

ABSTRACT: Measurements were made of the relative inelastic-reflection coefficient of primary electrons (E_p = 0.1--5 keV) incident at ϑ = 0--60° on Be, Al, Si, Ti, Ni, Au and Pb films (deposited by evaporation in high vacuum). This coefficient was defined as $\gamma = \eta_\vartheta/\eta_0$, where η_ϑ and η_0 are the inelastic-reflection coefficients for the angles ϑ and 0°. The dependence of γ on ϑ agreed well with

L 10765-65
ACCESSION NR: AP4044933

Luk'yanov's formula (ZhTF, v. 8, 671, 1938; Phys. Zs. Sow., v. 13, 123, 1938; ZhETF, v. 7, 856, 1937): $\ln \gamma \approx \ln B - (2/3)\cos\vartheta$ (B is a constant). The value of γ rose with E_p reaching saturation at E'_p, which depended on the substance and the angle of incidence. In heavy elements (e. g., Au, Pb) the saturation occurred early, at E'_p = 0.5--0.8 keV. In lighter elements (e.g. Be, Ti and Si) the saturation occurred much later: at 2--4.5 keV for $\vartheta = 30°$. The results were interpreted in terms of Bethe's theory (Ann. Phys. v. 5, 325, 1940). Orig. art. has: 6 figures and 1 formula.

ASSOCIATION: Leningradskiy gosudarstvenny*y pedagogicheskiy institut im. A. I. Gertsena (Leningrad State Pedagogical Institute)

SUBMITTED: 21Mar64 ENCL: 00

SUB CODE: SS NR REF SOV: 010 OTHER: 008

Card 2/2

BRONSHTEYN, I.M.; SHCHUCHINSKIY, Ya.M.

Energy distribution of the secondary electrons of the fourth period. Radiotekh. i elektron. 9 no.5:904-906 My '64.
(MIRA 17:7)

L 2499-66 EWT(1)/EPA(w)-2/EWA(m)-2 IJP(c) AT

ACCESSION NR: AP5014590 44,55 UR/0181/65/007/006/1846/1855 38

AUTHOR: Bronshteyn, I. M.; Denisov, S. S. 44,55 35

TITLE: Investigation of secondary electron emission 21,44,55 from solids induced by obliquely incident primary electrons B

SOURCE: Fizika tverdogo tela, v. 7, no. 6, 1965, 1846-1855

TOPIC TAGS: electron emission, secondary electron emission, angular distribution, electron reflection inelastic interaction

ABSTRACT: This is a continuation of earlier work by the authors (FTT v. 6, 2644, 1964), devoted to the angular dependence of the coefficient of secondary emission and of the coefficient of elastic reflection of the primary electrons. In the present article the authors establish certain laws governing the various secondary-emission parameters (coefficient of secondary emission, coefficient of inelastic reflection, efficiency of inelastic reflection, efficiency of primary electrons, relative number of secondary electrons) for beryllium, silicon, and lead for an obliguely incident primary beam, and the dependence of these parameters and of the energy distribution of the secondary electrons on the angle of incidence of the primary electrons. Particular attention is played to the role of inelastically

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L 2499-66

ACCESSION NR: AP5014590

3

reflected electrons in secondary emission. Plots of all the quantities against the primary energy and tables of the same quantities are included. Orig. art. has: 9 figures, 10 formulas, and 1 table.

ASSOCIATION: Leningradskiy gosudarstvennyy pedagogicheskiy institut im. A. I. Gertsena (Leningrad State Pedagogical Institute) 44,55

SUBMITTED: 17Sep64 ENCL: 00 SUB CODE: SS, NP

NR REF SOV: 012 OTHER: 001

Card 2/2

L 2208-66 EWT(1)/EPA(w)-2/EWA(m)-2 IJP(c) AT

ACCESSION NR: AP5017341

UR/0181/65/007/007/2252/2253

44,55

AUTHOR: Bronshteyn, I. M.; Denisov, S. S. 44,55

54 51

TITLE: Energy distribution of inelastically scattered electrons 21,44,55 in solids for an obliquely incident primary beam B

SOURCE: Fizika tverdogo tela, v. 7, no. 7, 1965, 2252-2253

TOPIC TAGS: electron scattering, inelastic scattering. electron bombardment, lead, beryllium

ABSTRACT: This is a continuation of earlier work (FTT v. 4, 2047, 1962) where it was shown that when the primary beam is normally incident, the energy distribution curves of inelastically reflected electrons are practically independent of the atomic number of the material. In the present study the authors investigated in detail the energy distribution of the electrons inelastically reflected from lead in the primary-electron range 0.6--3 kev and at angles 0--75°, as well as from beryllium in the energy range 1--2.5 kev and at angles 0--80°. The experimental technique and the procedure are described in the earlier papers. Only the delay curves for e_p = 2 kev are presented in the article. For the other values of e_p, the delay curves will be identical in form. The results indicate that the energy distribution of the inelastically-reflected electrons does not depend on the angle

L 2208-66

ACCESSION NR: AP5017341

3

at which the primary electrons strike the solid. It is deduced therefore that the angular distribution of the inelastically reflected electrons should likewise be independent of the angle of incidence. Orig. art. has: 1 figure.

ASSOCIATION: Lenigradskiy gosudarstvennyy pedagogicheskiy institut im. A. I. Gertsena (Leningrad State Pedagogical Institute) 44,55

SUBMITTED: 02Mar65 ENCL: 00 SUB CODE: SS

NR REF SOV: 004 OTHER: 003

Card 2/2 DP

EWT(1)/EWT(m)/EWP(w)/EWP(t)/ETI IJP(c) JD/AT

ACC NR: AR6031906 SOURCE CODE: UR/0058/66/000/006/H053/H053

AUTHOR: Bronshteyn, I. M.; Roshchin, V. V.

TITLE: Secondary electron emission of metals at low primary electron energies

SOURCE: Ref. zh. Fizika, Abs. 6Zh374

REF SOURCE: Uch. zap. Leningr. gos. ped. in-ta im. A. I. Gertsena, v. 265, 1965, 349-351

TOPIC TAGS: secondary electron emission, electron emission, electron scattering, primary electron, secondary electron

ABSTRACT: In the obtained capture and dependency curves $\sigma(E_p)$, $r(E_p)$, and $\delta(E_p)$, σ is the coefficient of secondary electron emission, r is the coefficient of elastic reflection, $\delta=\sigma-r$, and E_p is the primary electron energy for a poorly degassed Ag disk. These curves are different from similar curves for pure metals. Therefore, the capture curve has a small inclination even at E_p = 2 ev. The slope increases for electrons with a larger E_p. This means that even at the smallest E_p in the spectrum of secondary electrons it is possible to observe inelastic reflected electrons. Therefore, it cannot be asserted that r = σ in the region $1 < E_p \lesssim 4$ ev.

Card 1/2